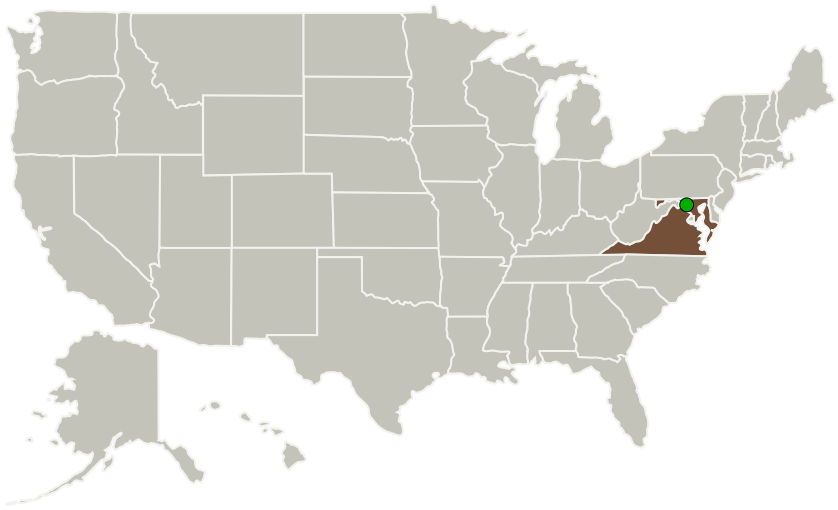
Hight Energy Fiber Laser Based Lidar Transmitter for Topographic Mapping, Phase I

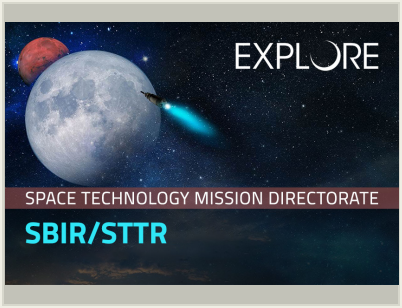
Completed Technology Project (2011 - 2011)

Project Introduction

This SBIR will develop core Yb laser technology that is higher than 50% optical to optical efficient with pulse energies up to 300uJ/pulse in the all fiber version and up to 5mJ using planer waveguide power amplifiers. This SBIR try to newest fiber technology ⬭ 3C fiber as the gain medium fiber to improve the stability of beam profile, pointing and polarization stability to suitable for space working environment. The proposed laser transmitter is based on Fibertek's proprietary laser architecture that utilize state-of-the-art optical and ultra high bandwidth RF analog and digital electronic component technologies. Technical Objectives of SBIR program: Analysis and Design of high energy, high efficient fiber based 3C amplifier transmitter at the 1030 nm. Laboratory Benchtop Demonstration of 300uJ/pulse operation at 10 kHz with 1.5 ns pulse width and >17dB PER Design fibre-PWG hybrid amplifier and have PWG fabricated and tested Work Plan for Phase I: Model & optimize both type amplifiers' parameters for high energy, high efficiency and stability Build fiber based lidar transmitter and demonstrate proposed operation in the laboratory environment. Initial investigate on the PWG optical characterizations and amplification performance.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Fibertek, Inc.	Lead Organization	Industry	Herndon, Virginia
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Virginia

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138595)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Fibertek, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

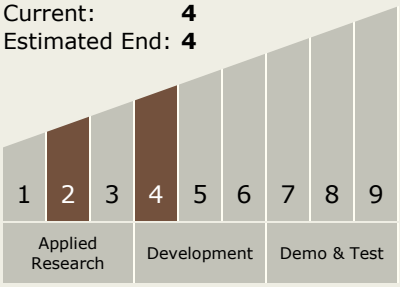
Carlos Torrez

Principal Investigator:

Youming Chen

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System